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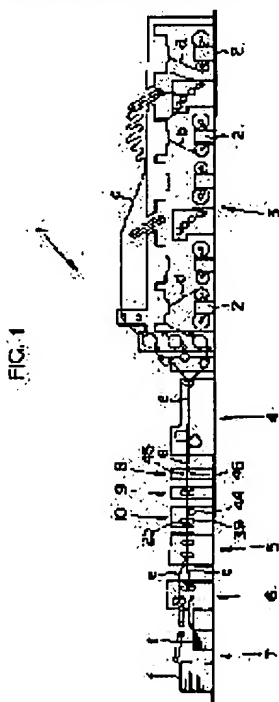
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(54) CORRUGATING MACHINE



(57)Abstract:

PROBLEM TO BE SOLVED: To provide a corrugating machine which can easily form breaking perforations in a high accuracy and which can improve the manufacturing efficiency of a corrugated fiberboard case.

SOLUTION: The corrugating machine comprises a single facer 3 for laminating a corrugated core (b) on a rear liner (a) to form a single-faced corrugated fiberboard (c), a double facer 4 for laminating a front liner (d) on the fiberboard (c) to form a corrugated fiberboard (e), and a slit-scorer 5 for cutting in a predetermined width size and forming a scoring line. The machine further comprises a liner cutter 10 for forming the breaking perforations at the fiberboard (e) along the conveying direction of the fiberboard (e) between the double facer 4 and the slit-scorer 5.

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CLAIMS

[Claim(s)]

[Claim 1] The single facer which pastes a green sand core with a stage together to a flesh-side liner, and forms piece corrugated paper, In a corrugated machine equipped with the double facer which pastes a front liner together to this piece corrugated paper, and forms corrugated paper, and the slitting machine scorekeeper who forms a fold ruled line while ****ing by the predetermined width method The corrugated machine characterized by forming the liner cut equipment which forms the perforation for fracture along the conveyance direction of said corrugated paper among said double facers and said slitting machine scorekeepers at one [at least] liner of this corrugated paper.

[Claim 2] two or more cutting edges to which said liner cut equipment projects in the shape of a serrated knife in the direction of a path -- the perimeter -- having -- this -- the disc-like cutting edge which can move freely in the direction which cuts a cutting edge deeply to said corrugated paper -- with a roll this -- a cutting edge -- the support roll which counters a roll and receives said corrugated paper, and said cutting edge -- making a roll move toward said support roll -- a cutting edge -- the corrugated machine according to claim 1 characterized by having an accommodation means to adjust the spacing dimension of a roll and a support roll.

[Claim 3] said liner cut equipment -- said cutting edge -- while consisting in the direction which intersects perpendicularly a roll and said accommodation means in the conveyance direction of corrugated paper and equipping it with two or more predetermined spacing -- each -- a cutting edge -- the alienation which makes a roll estrange alternatively from the infeed location to said corrugated paper -- the corrugated machine according to claim 2 characterized by having a driving means.

[Claim 4] said liner cut equipment -- each -- a cutting edge -- the corrugated machine according to claim 3 characterized by having two or more rotation driving means which carry out the rotation drive of the roll with the peripheral speed according to individual, respectively.

[Claim 5] said liner cut equipment -- each -- a cutting edge -- while having a roll in the direction which intersects perpendicularly in the conveyance direction of corrugated paper free [traverse] -- each -- a cutting edge -- the corrugated machine according to claim 3 or 4 characterized by having a traverse means to traverse a roll.

[Claim 6] a thickness detection means detect the thickness dimension of corrugated paper between said double facer and said liner cut equipment -- preparing -- said liner cut equipment -- said support roll -- said cutting edge -- claim 2 characterized by to have the attitude driving means which makes a support roll move according to the detection dimension by said thickness detection means while having towards a roll free [an attitude] thru/or the corrugated machine of five given in any 1 term.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the corrugated machine which manufactures the paper board of the shape of a rectangle for cutting this corrugated paper and forming a carton box while it makes a long liner rival and forms corrugated paper.

[0002]

[Description of the Prior Art] In order to do easy the activity at the time of opening the carton box which contained contents, as shown in drawing 7, installing perforation g for fracture in carton box h is performed. Moreover, the tab i by H character-like slitting is formed in the fracture starting position of perforation g for fracture, and in case perforation g for fracture is fractured, this tab i serves as a key. While holding the reinforcement of carton box h, in order to maintain an appearance good, as shown in drawing 8, as for such perforation g for fracture, it is desirable to be prepared in the flesh-side liner a of corrugated paper e which becomes the inside side of carton box h.

[0003] By the way, the rectangle-like paper board is first manufactured by the corrugated machine, and this kind of carton box h is manufactured by performing printing and blanking processing to the paper board formed by this corrugated machine after that.

[0004] The single facer which said corrugated machine pastes the green sand core b with a stage together to the flesh-side liner a, and forms a single faced corrugated fiberboard, The double facer which pastes a front liner together to this single faced corrugated fiberboard, and forms corrugated paper, It has the slitting machine scorekeeper who judges to predetermined width of face, the cutter which cuts to predetermined die length and forms the rectangle-like paper board, and the composition that the stacker which accumulates each paper board on a predetermined expenditure location was arranged toward the lower stream of a river according to the configuration of the paper board from the upstream, putting in a fold line.

[0005] Conventionally, it is known that said perforation g for fracture will be formed by the liner cut equipment formed in said single facer. According to this, before a flesh-side liner and a green sand core with a stage are pasted together, perforation g for fracture can be formed only in a flesh-side liner.

[0006] In this corrugated machine, as explanatorily shown in drawing 9, it is necessary to maintain correctly spacing of perforation g for fracture, and Traverse j in the predetermined dimension y at the time of decision by said slitting machine scorekeeper 50. However, since the distance from said single facer to this slitting machine scorekeeper 50 is a long distance comparatively, meandering arises in long corrugated paper and there is un-arranging with it difficult [to maintain said predetermined dimension y and to perform exact decision].

[0007] Moreover, forming perforation g for fracture in the corrugated paperboard paid out of the corrugated machine in addition to it is performed. In this case, it is known that said perforation g for fracture will be formed by the liner cut equipment formed in the printing machine which prints to the paper board.

[0008] However, the conveyance direction of the corrugated paperboard in this kind of printing machine may differ from the conveyance direction of the corrugated paper in a corrugated machine. Namely, generally, perforation g for fracture is prepared in the direction of a concave

protruding line of a green sand core b, and the crossing direction, as shown in drawing 8 , but since the conveyance direction of the corrugated paperboard in a printing machine is made into the direction which met in the direction of a concave protruding line of a green sand core, even if it forms perforation g for fracture along the conveyance direction, this perforation g for fracture does not cross in the direction of a concave protruding line of a green sand core b. In this case, in order to make the conveyance direction of a printing machine in agreement in the direction which forms perforation g for fracture, there is un-arranging [which must perform large-scale retooling] .

[0009] moreover, this kind of liner cut equipment is shown in drawing 10 -- as -- two or more cutting edges -- a roll 25 -- each -- a cutting edge -- the thing equipped with two or more support rolls 51 which counter a roll 25 is known. each -- a cutting edge -- as a roll 25 is shown in drawing 1111 , it has two or more cutting edges 27 which project in the shape of a serrated knife in the direction of a path along a hoop direction, and quantity is defined with the number of picking of the box in the cross direction of corrugated paper. namely, -- the case (generally called two-dish picking) where put in a row two carton box h shown in drawing 7 , and it is manufactured -- the cutting edge of a pair -- 4 sets is supported to revolve by the single revolving shaft 52, using a roll 25 as 1 set. furthermore, a rate with this revolving shaft 52 slightly quicker than the transit rate of corrugated paper -- each -- a cutting edge -- it drives so that a roll 25 may be rotated. In addition, the rotational speed of this revolving shaft 52 is set as the rate which ensures slitting to the flesh-side liner a of a cutting edge 27, and maintains discontinuous slitting. [0010] however, the cutting edge of each class -- dispersion produces a roll 25 to a wear degree - - it is -- this -- each -- a cutting edge -- there is [the peripheral speed of a roll 25 not only differs, but] a possibility that the slitting depth to a flesh-side liner may differ, and it becomes difficult to form perforation g for fracture certainly. and -- each -- a cutting edge -- since the rotation drive of the roll 25 is carried out with the single revolving shaft 52 -- each cutting edge -- there is un-arranging [which cannot adjust the peripheral speed of a roll 25 and the amount of slitting to the flesh-side liner a to each **]. furthermore -- the case where the number of picking of the box in the cross direction of corrugated paper is changed -- a cutting edge -- a cutting edge large-scale in order to make it correspond to the number of picking of the box which had the number of rolls 25 changed -- exchange of a roll 25 must be performed and there is un-arranging used as the cause that the manufacture effectiveness of a carton box falls.

[0011]

[Problem(s) to be Solved by the Invention] It cancels this un-arranging, and this invention can form the high perforation for fracture of precision easily, and aims at offering the corrugated machine which can moreover raise the manufacture effectiveness of a carton box.

[0012]

[Means for Solving the Problem] The single facer which this invention pastes a green sand core with a stage together to a flesh-side liner, and forms piece corrugated paper in order to attain this purpose, In a corrugated machine equipped with the double facer which pastes a front liner together to this piece corrugated paper, and forms corrugated paper, and the slitting machine scorekeeper who forms a fold ruled line while ****ing by the predetermined width method It is characterized by forming the liner cut equipment which forms the perforation for fracture along the conveyance direction of said corrugated paper among said double facers and said slitting machine scorekeepers at one [at least] liner of this corrugated paper.

[0013] Since the perforation for fracture can be formed in a comparatively near location from said slitting machine scorekeeper by forming said liner cut equipment among said double facers

and said slitting machine scorekeepers according to this invention, the precision of the formation location of the perforation for fracture can be improved by making the bad influence of meandering of the corrugated paper conveyed into smallness. And the perforation for fracture can be prepared in the direction of a concave protruding line of the green sand core of corrugated paper, and the crossing direction only by forming the perforation for fracture along the conveyance direction of corrugated paper with a printing machine like before etc. unlike the case where the perforation for fracture is formed.

[0014] In this invention moreover, said liner cut equipment two or more cutting edges which project in the shape of a serrated knife in the direction of a path -- the perimeter -- having -- this -- the disc-like cutting edge which can move freely in the direction which cuts a cutting edge deeply to said corrugated paper -- with a roll this -- a cutting edge -- the support roll which counters a roll and receives said corrugated paper, and said cutting edge -- making a roll move toward said support roll -- a cutting edge -- it is characterized by having an accommodation means to adjust the spacing dimension of a roll and a support roll.

[0015] according to this invention -- for example -- said cutting edge -- wear of a roll -- a cutting edge -- the time of the spacing dimension of a roll and a support roll becoming size -- said accommodation means -- a cutting edge -- the spacing dimension of a roll and a support roll can be adjusted proper. this -- a cutting edge -- poor slitting by wear of a roll can be prevented and the perforation for fracture can be formed certainly.

[0016] moreover, this invention -- setting -- said liner cut equipment -- said cutting edge -- while consisting in the direction which intersects perpendicularly a roll and said accommodation means in the conveyance direction of corrugated paper and equipping it with two or more predetermined spacing -- each -- a cutting edge -- the alienation which makes a roll estrange alternatively from the infeed location to said corrugated paper -- it is characterized by having a driving means.

[0017] The corrugated paper manufactured in a corrugated machine is formed in the width of face which can perform two or more box picking. this time -- the number of picking of a box -- responding -- a cutting edge -- a roll consists predetermined spacing and are formed. [two or more] in this case -- each -- a cutting edge -- having said accommodation means for every roll -- each cutting edge -- even if dispersion in wear arises on a roll -- each -- a cutting edge -- a spacing dimension with a support roll can be adjusted proper for every roll. moreover, said alienation -- the cutting edge which became unnecessary by having changed the number of picking of a box by having a driving means -- only a roll can be made to be able to estrange from corrugated paper and can be evacuated. While being able to make it able to respond to modification of the number of picking of a box and being able to raise the manufacture effectiveness of a carton box, without carrying out large-scale retooling by this, the increment in cost can be prevented.

[0018] moreover, this invention -- setting -- said liner cut equipment -- each -- a cutting edge -- it is characterized by having two or more rotation driving means which carry out the rotation drive of the roll with the peripheral speed according to individual, respectively. thereby -- each -- a cutting edge -- since the peripheral speed according to wear can be driven to each ** even if dispersion in a wear degree arises on a roll, the high perforation for fracture of precision can be formed.

[0019] moreover, this invention -- setting -- said liner cut equipment -- each -- a cutting edge -- while having a roll in the direction which intersects perpendicularly in the conveyance direction of corrugated paper free [traverse] -- each -- a cutting edge -- it is characterized by having a

traverse means to traverse a roll. modification of the formation location of the perforation for fracture accompanying the number of picking of a box having been changed by this -- each -- a cutting edge -- the slitting location of a roll can be made to correspond easily It can be made to correspond to modification of the number of picking of a box, without carrying out large-scale retooling by this.

[0020] moreover, a thickness detection means detect the thickness dimension of corrugated paper between said double facer and said liner cut equipment in this invention -- preparing -- said liner cut equipment -- said support roll -- said cutting edge -- while having towards a roll free [an attitude], it is characterized by to have the attitude driving means which makes a support roll move according to the detection dimension by said thickness detection means. For example, when the thickness of corrugated paper is changed by modification of the corrugated paper specification manufactured by the corrugated machine concerned etc., said thickness detection means detects the thickness of this corrugated paper, and a support roll is made to move by said attitude driving means based on this detection result. thus, the cutting edge to the corrugated paper guided with a support roll since the guidance location of corrugated paper with a support roll is correctly maintainable according to it even if the thickness of corrugated paper changes -- the amount of slitting of a roll can be adjusted very easily.

[0021]

[Embodiment of the Invention] One operation gestalt of this invention is explained based on a drawing. the outline block diagram in which drawing 1 shows the corrugated machine of this operation gestalt, the explanatory view in which drawing 2 shows the configuration of liner cut equipment, and drawing 3 -- the III-III line cross-section explanatory view of drawing 2, and drawing 4 -- the IV-IV line cross-section explanatory view of drawing 2 R> 2, and drawing 5 -- the V-V line cross-section explanatory view of drawing 3, and drawing 6 -- a cutting edge -- it is the explanatory view showing the rotation driving means of a roll.

[0022] In drawing 1, 1 is the corrugated machine of this operation gestalt, and is equipped with the single facer 3 which pastes together the flesh-side liner a and green sand core b which were supported by two or more mill roll stands 2, and forms piece corrugated paper c, and the double facer 4 which pastes the front liner d together to this piece corrugated paper c, and forms corrugated paper e in it. It has the slitting machine scorekeeper 5 who judges to predetermined width of face, putting a fold line into the lower stream of a river of a double facer 4 at corrugated paper e, and has the cutter 6 which cuts corrugated paper e to predetermined length on this slitting machine scorekeeper's 5 lower stream of a river, and forms the rectangle-like paper board f. Furthermore, the lower stream of a river of a cutter 6 is equipped with the stacker 7 which accumulates each paper board f on a predetermined expenditure location according to the configuration of the paper board f.

[0023] And in the corrugated machine 1 of this operation gestalt, the corrugated paper thickness detection unit (thickness detection means) 8, a circular shear 9, and liner cut equipment 10 are formed sequentially from the upstream between the double facer 4 and the slitting machine scorekeeper 5.

[0024] This liner cut equipment 10 forms the perforation for fracture (refer to sign [of drawing 8] g) in the flesh-side liner a of corrugated paper e of the long picture conveyed from a double facer 4. If it explains in full detail about this liner cut equipment 10, as shown in drawing 2, the cotton of the beam 12 of a square shape is carried out to the frame 11 of the pair set up on both sides. As shown in drawing 2 and drawing 3, the movable carriage 14 which can slide freely is attached in this beam 12 along the cross direction of corrugated paper e by the guide members

13, such as a linear way. In addition, although one movable carriage 14 is shown in drawing 2, if three-dish [a maximum of] picking is performed in fact, six movable carriages 14 are formed. [0025] As shown in drawing 2 and drawing 4, the motor 15 (traverse means) is formed in the movable carriage 14, and as shown in drawing 4, the pinion 16 is formed in the shaft of this motor 15. This pinion 16 can gear on the rack 17 prepared in the beam 12, and when a motor 15 rotates, a movable carriage 14 can be moved crosswise.

[0026] The supporter material 18 is being fixed to the movable carriage 14, and as shown in drawing 5, the middle cylinder 19 is supported by the supporter material 18 free [rotation]. In the middle cylinder 19, it is fixed and attached through the key which the spline cylinder 20 does not illustrate. The spline cylinder 20 has got into gear to the castellated shaft 21 by which cotton was carried out between frames 11 (**2**). And as shown in drawing 2, as for the end of a castellated shaft 21, the revolving shaft of a motor 22 is connected. Although not illustrated in detail, this motor 22 is constituted so that it can be suitably set as a different rate from the bearer rate of corrugated paper e. Moreover, as shown in drawing 5, the drive sprocket 23 is attached in the end section of the middle cylinder 19.

[0027] The arm 24 is attached in the periphery of said middle cylinder 19 free [rocking]. the other end of this arm 24 -- the cutting edge of a pair -- the support shaft 26 of a roll 25 is attached free [rotation]. this -- a cutting edge -- a roll 25 is the same as that of what was explained in the Prior-art column, and equips the periphery perimeter with two or more cutting edges 27 which project in the shape of a serrated knife as shown in drawing 10. the cutting edge of a pair -- a roll 25 is supported by the arm 24 and constitutes the knife head 28. The driven sprocket wheel 29 is attached in the edge of the support shaft 26. This driven sprocket wheel 29 is connected to said drive sprocket 23 through the chain 30, and the rotation driving force of said castellated shaft 21 is transmitted to the knife head 28.

[0028] As shown in drawing 3, an accommodation means 31 to fine-adjust the amount of slitting of the knife head 28 is formed in said movable carriage 14. This accommodation means 31 is constituted by the mount 33 which is guided at the guide members 32, such as a linear way established in the movable carriage 14, and slides up and down, the motor 35 by which it was prepared in the movable carriage 14, and the screw shaft 34 was connected with the revolving shaft, and the screwing member 36 which it is prepared in a mount 33 and the screw shaft 34 screws. Thereby, a mount 33 moves up and down by rotating a motor 35. Moreover, the air cylinder 37 is attached in the mount 33, and the rod 38 is connected at the tip of an arm 24. Therefore, an arm 24 rocks with telescopic motion of the rod 38 of an air cylinder 37. in addition, this air cylinder 37 -- alienation of this invention -- a driving means is constituted.

[0029] Moreover, as shown in drawing 2, the support roll 39 is formed under the knife head 28. This support roll 39 is supported free [rotation] by the eccentric 40 supported by the frame 11 free [rotation]. The gearing 41 is formed in the both ends of an eccentric 40, and a rotation drive is carried out by the motor 43 (attitude driving means) through the intermediate-gear shaft 42. Namely, if a motor 43 is rotated, an eccentric 40 will rotate and the support roll 39 will carry out attitude migration in the vertical direction. Although the support roll 39 is not illustrated, the rotation drive of it is carried out at the bearer rate and **** rate of corrugated paper e by the drive network which drives the corrugated machine 1 whole, or the independent drive motor.

[0030] Moreover, as shown in drawing 1, the guide roll 44 driven at corrugated paper e and a **** rate near the upstream of the support roll 39 is formed, it has two incomes with the support roll 39, and the conveyance posture of corrugated paper e is maintained at stability.

[0031] Said corrugated paper thickness detection unit 8 is equipped with the laser displacement

gages 45 and 46 of the pair which counters up and down through corrugated paper e conveyed as shown in drawing 1 . This thickness detection unit 8 detects the thickness of corrugated paper e from a difference with a reference value, when the upper displacement gage 45 measures the surface location of the flesh-side liner a of corrugated paper e and the downward displacement gage 46 measures the surface location of the front liner d of corrugated paper e to coincidence.

[0032] Next, actuation of the liner cut equipment 10 in the corrugated machine 1 of this operation gestalt is explained. With reference to drawing 2 , said motor 15 is driven, a movable carriage 14 is first, traversed along with the guide member 13, and the knife head 28 is moved to a predetermined processing location. Subsequently, the rod 38 of an air cylinder 37 is expanded and the knife head 28 is dropped (let this location be an operation location). If there is an unnecessary knife head 28 due to the number of picking of a carton box, the rise location (let this be a position in readiness) will be made to stand by at this time.

[0033] subsequently, this time -- an operation location -- setting -- a cutting edge -- when the clearance x between the tip of a roll 25 and the support roll 39 is not proper, the motor 35 of the accommodation means 31 is driven and the location of an air cylinder 37 is fine-adjusted. since this accommodation means 31 can be fine-adjusted about each knife head 28 -- a cutting edge -- even if wear has arisen on the roll 25, according to a wear degree, said clearance x can be adjusted proper.

[0034] Then, the rotation drive of the knife head 28 is carried out, and conveyance of corrugated paper e (**1**) is started. this time -- the bearer rate of corrugated paper e, and a cutting edge - - by controlling rotation of a drive motor 22, the speed difference with the rotational speed of a roll 25 can be set as the suitable speed difference.

[0035] Moreover, the thickness of ***** is detected by said thickness detection unit 8 when the thickness dimension of corrugated paper e is changed by order change etc. with reference to drawing 1 . And as shown in drawing 2 , the attitude migration of the support roll 39 can be made to be able to carry out in the vertical direction by rotation of said motor 43, and the clearance x to the knife head 28 can be adjusted proper.

[0036] in addition, driving force transfer of the motor 22 according to said castellated shaft 21 as this operation gestalt is shown in drawing 3 -- the cutting edge of the knife head 28 -- although the roll 25 was rotated, as long as it gives other examples, as shown in drawing 6 , the revolving shaft of a motor 47 may be connected with the support shaft 26 of the knife head 28. At this time, a motor 47 is supported by said arm 24 through the supporter material 48. According to this, the rotation drive of the knife head 28 prepared can be carried out by each motor 47 at each **. [two or more] and -- thereby -- the cutting edge of each knife head 28 -- a roll 25 can be rotated with the rotational speed according to the wear degree, and high perforation g for fracture of precision can be formed certainly.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the corrugated machine which manufactures the paper board of the shape of a rectangle for cutting this corrugated paper and forming a carton box while it makes a long liner rival and forms corrugated paper.

PRIOR ART

[Description of the Prior Art] In order to do easy the activity at the time of opening the carton box which contained contents, as shown in drawing 7 , installing perforation g for fracture in carton box h is performed. Moreover, the tab i by H character-like slitting is formed in the fracture starting position of perforation g for fracture, and in case perforation g for fracture is fractured, this tab i serves as a key. While holding the reinforcement of carton box h, in order to maintain an appearance good, as shown in drawing 8 , as for such perforation g for fracture, it is desirable to be prepared in the flesh-side liner a of corrugated paper e which becomes the inside side of carton box h.

[0003] By the way, the rectangle-like paper board is first manufactured by the corrugated machine, and this kind of carton box h is manufactured by performing printing and blanking processing to the paper board formed by this corrugated machine after that.

[0004] The single facer which said corrugated machine pastes the green sand core b with a stage together to the flesh-side liner a, and forms a single faced corrugated fiberboard, The double facer which pastes a front liner together to this single faced corrugated fiberboard, and forms corrugated paper, It has the slitting machine scorekeeper who judges to predetermined width of face, the cutter which cuts to predetermined die length and forms the rectangle-like paper board, and the composition that the stacker which accumulates each paper board on a predetermined expenditure location was arranged toward the lower stream of a river according to the configuration of the paper board from the upstream, putting in a fold line.

[0005] Conventionally, it is known that said perforation g for fracture will be formed by the liner cut equipment formed in said single facer. According to this, before a flesh-side liner and a green sand core with a stage are pasted together, perforation g for fracture can be formed only in a flesh-side liner.

[0006] In this corrugated machine, as explanatorily shown in drawing 9 , it is necessary to maintain correctly spacing of perforation g for fracture, and Traverse j in the predetermined dimension y at the time of decision by said slitting machine scorekeeper 50. However, since the distance from said single facer to this slitting machine scorekeeper 50 is a long distance comparatively, meandering arises in long corrugated paper and there is un-arranging with it difficult [to maintain said predetermined dimension y and to perform exact decision].

[0007] Moreover, forming perforation g for fracture in the corrugated paperboard paid out of the corrugated machine in addition to it is performed. In this case, it is known that said perforation g for fracture will be formed by the liner cut equipment formed in the printing machine which prints to the paper board.

[0008] However, the conveyance direction of the corrugated paperboard in this kind of printing machine may differ from the conveyance direction of the corrugated paper in a corrugated machine. Namely, generally, perforation g for fracture is prepared in the direction of a concave protruding line of a green sand core b, and the crossing direction, as shown in drawing 8 , but since the conveyance direction of the corrugated paperboard in a printing machine is made into the direction which met in the direction of a concave protruding line of a green sand core, even if it forms perforation g for fracture along the conveyance direction, this perforation g for fracture does not cross in the direction of a concave protruding line of a green sand core b. In this case, in order to make the conveyance direction of a printing machine in agreement in the direction which forms perforation g for fracture, there is un-arranging [which must perform large-scale

retooling].

[0009] moreover, this kind of liner cut equipment is shown in drawing 10 -- as -- two or more cutting edges -- a roll 25 -- each -- a cutting edge -- the thing equipped with two or more support rolls 51 which counter a roll 25 is known. each -- a cutting edge -- as a roll 25 is shown in drawing 1111 , it has two or more cutting edges 27 which project in the shape of a serrated knife in the direction of a path along a hoop direction, and quantity is defined with the number of picking of the box in the cross direction of corrugated paper. namely, -- the case (generally called two-dish picking) where put in a row two carton box h shown in drawing 7 , and it is manufactured -- the cutting edge of a pair -- 4 sets is supported to revolve by the single revolving shaft 52, using a roll 25 as 1 set. furthermore, a rate with this revolving shaft 52 slightly quicker than the transit rate of corrugated paper -- each -- a cutting edge -- it drives so that a roll 25 may be rotated. In addition, the rotational speed of this revolving shaft 52 is set as the rate which ensures slitting to the flesh-side liner a of a cutting edge 27, and maintains discontinuous slitting. [0010] however, the cutting edge of each class -- dispersion produces a roll 25 to a wear degree - - it is -- this -- each -- a cutting edge -- there is [the peripheral speed of a roll 25 not only differs, but] a possibility that the slitting depth to a flesh-side liner may differ, and it becomes difficult to form perforation g for fracture certainly. and -- each -- a cutting edge -- since the rotation drive of the roll 25 is carried out with the single revolving shaft 52 -- each cutting edge -- there is un-arranging [which cannot adjust the peripheral speed of a roll 25 and the amount of slitting to the flesh-side liner a to each **]. furthermore -- the case where the number of picking of the box in the cross direction of corrugated paper is changed -- a cutting edge -- a cutting edge large-scale in order to make it correspond to the number of picking of the box which had the number of rolls 25 changed -- exchange of a roll 25 must be performed and there is un-arranging used as the cause that the manufacture effectiveness of a carton box falls.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] It cancels this un-arranging, and this invention can form the high perforation for fracture of precision easily, and aims at offering the corrugated machine which can moreover raise the manufacture effectiveness of a carton box.

MEANS

[Means for Solving the Problem] The single facer which this invention pastes a green sand core with a stage together to a flesh-side liner, and forms piece corrugated paper in order to attain this purpose, In a corrugated machine equipped with the double facer which pastes a front liner together to this piece corrugated paper, and forms corrugated paper, and the slitting machine scorekeeper who forms a fold ruled line while ****ing by the predetermined width method It is characterized by forming the liner cut equipment which forms the perforation for fracture along the conveyance direction of said corrugated paper among said double facers and said slitting machine scorekeepers at one [at least] liner of this corrugated paper.

[0013] Since the perforation for fracture can be formed in a comparatively near location from said slitting machine scorekeeper by forming said liner cut equipment among said double facers

and said slitting machine scorekeepers according to this invention, the precision of the formation location of the perforation for fracture can be improved by making the bad influence of meandering of the corrugated paper conveyed into smallness. And the perforation for fracture can be prepared in the direction of a concave protruding line of the green sand core of corrugated paper, and the crossing direction only by forming the perforation for fracture along the conveyance direction of corrugated paper with a printing machine like before etc. unlike the case where the perforation for fracture is formed.

[0014] In this invention moreover, said liner cut equipment two or more cutting edges which project in the shape of a serrated knife in the direction of a path -- the perimeter -- having -- this -- the disc-like cutting edge which can move freely in the direction which cuts a cutting edge deeply to said corrugated paper -- with a roll this -- a cutting edge -- the support roll which counters a roll and receives said corrugated paper, and said cutting edge -- making a roll move toward said support roll -- a cutting edge -- it is characterized by having an accommodation means to adjust the spacing dimension of a roll and a support roll.

[0015] according to this invention -- for example -- said cutting edge -- wear of a roll -- a cutting edge -- the time of the spacing dimension of a roll and a support roll becoming size -- said accommodation means -- a cutting edge -- the spacing dimension of a roll and a support roll can be adjusted proper. this -- a cutting edge -- poor slitting by wear of a roll can be prevented and the perforation for fracture can be formed certainly.

[0016] moreover, this invention -- setting -- said liner cut equipment -- said cutting edge -- while consisting in the direction which intersects perpendicularly a roll and said accommodation means in the conveyance direction of corrugated paper and equipping it with two or more predetermined spacing -- each -- a cutting edge -- the alienation which makes a roll estrange alternatively from the infeed location to said corrugated paper -- it is characterized by having a driving means.

[0017] The corrugated paper manufactured in a corrugated machine is formed in the width of face which can perform two or more box picking. this time -- the number of picking of a box -- responding -- a cutting edge -- a roll consists predetermined spacing and are formed. [two or more] in this case -- each -- a cutting edge -- having said accommodation means for every roll -- each cutting edge -- even if dispersion in wear arises on a roll -- each -- a cutting edge -- a spacing dimension with a support roll can be adjusted proper for every roll. moreover, said alienation -- the cutting edge which became unnecessary by having changed the number of picking of a box by having a driving means -- only a roll can be made to be able to estrange from corrugated paper and can be evacuated. While being able to make it able to respond to modification of the number of picking of a box and being able to raise the manufacture effectiveness of a carton box, without carrying out large-scale retooling by this, the increment in cost can be prevented.

[0018] moreover, this invention -- setting -- said liner cut equipment -- each -- a cutting edge -- it is characterized by having two or more rotation driving means which carry out the rotation drive of the roll with the peripheral speed according to individual, respectively. thereby -- each -- a cutting edge -- since the peripheral speed according to wear can be driven to each ** even if dispersion in a wear degree arises on a roll, the high perforation for fracture of precision can be formed.

[0019] moreover, this invention -- setting -- said liner cut equipment -- each -- a cutting edge -- while having a roll in the direction which intersects perpendicularly in the conveyance direction of corrugated paper free [traverse] -- each -- a cutting edge -- it is characterized by having a

traverse means to traverse a roll. modification of the formation location of the perforation for fracture accompanying the number of picking of a box having been changed by this -- each -- a cutting edge -- the slitting location of a roll can be made to correspond easily It can be made to correspond to modification of the number of picking of a box, without carrying out large-scale retooling by this.

[0020] moreover, a thickness detection means detect the thickness dimension of corrugated paper between said double facer and said liner cut equipment in this invention -- preparing -- said liner cut equipment -- said support roll -- said cutting edge -- while having towards a roll free [an attitude], it is characterized by to have the attitude driving means which makes a support roll move according to the detection dimension by said thickness detection means. For example, when the thickness of corrugated paper is changed by modification of the corrugated paper specification manufactured by the corrugated machine concerned etc., said thickness detection means detects the thickness of this corrugated paper, and a support roll is made to move by said attitude driving means based on this detection result. thus, the cutting edge to the corrugated paper guided with a support roll since the guidance location of corrugated paper with a support roll is correctly maintainable according to it even if the thickness of corrugated paper changes -- the amount of slitting of a roll can be adjusted very easily.

[0021]

[Embodiment of the Invention] One operation gestalt of this invention is explained based on a drawing. the outline block diagram in which drawing 1 shows the corrugated machine of this operation gestalt, the explanatory view in which drawing 2 shows the configuration of liner cut equipment, and drawing 3 -- the III-III line cross-section explanatory view of drawing 2, and drawing 4 -- the IV-IV line cross-section explanatory view of drawing 2 R> 2, and drawing 5 -- the V-V line cross-section explanatory view of drawing 3, and drawing 6 -- a cutting edge -- it is the explanatory view showing the rotation driving means of a roll.

[0022] In drawing 1, 1 is the corrugated machine of this operation gestalt, and is equipped with the single facer 3 which pastes together the flesh-side liner a and green sand core b which were supported by two or more mill roll stands 2, and forms piece corrugated paper c, and the double facer 4 which pastes the front liner d together to this piece corrugated paper c, and forms corrugated paper e in it. It has the slitting machine scorekeeper 5 who judges to predetermined width of face, putting a fold line into the lower stream of a river of a double facer 4 at corrugated paper e, and has the cutter 6 which cuts corrugated paper e to predetermined length on this slitting machine scorekeeper's 5 lower stream of a river, and forms the rectangle-like paper board f. Furthermore, the lower stream of a river of a cutter 6 is equipped with the stacker 7 which accumulates each paper board f on a predetermined expenditure location according to the configuration of the paper board f.

[0023] And it sets in the corrugated machine 1 of this operation gestalt, and is a corrugated paper thickness detection unit from the upstream to order between a double facer 4 and the slitting machine scorekeeper 5.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The outline block diagram showing the corrugated machine of 1 operation gestalt of this invention.

[Drawing 2] The explanatory view showing the configuration of liner cut equipment.

[Drawing 3] The III-III line cross-section explanatory view of drawing 2 .

[Drawing 4] The IV-IV line cross-section explanatory view of drawing 2 .

[Drawing 5] The V-V line cross-section explanatory view of drawing 3 .

[Drawing 6] a cutting edge -- the explanatory view showing the rotation driving means of a roll.

[Drawing 7] The top view showing the carton box of an expansion condition.

[Drawing 8] The sectional view of corrugated paper.

[Drawing 9] A slitting machine scorekeeper's actuation explanatory view.

[Drawing 10] The explanatory view showing the configuration of conventional liner cut equipment.

[Drawing 11] a cutting edge -- the explanatory view showing some rolls.

[Description of Notations]

a [-- A table liner, e / -- Corrugated paper,] -- A flesh-side liner, b -- A green sand core, c -- Piece corrugated paper, d g -- The perforation for fracture, 3 -- A single facer, 4 -- Double facer, 5 -- A slitting machine scorekeeper, 1 -- A corrugated machine, 8 -- Thickness detection unit (thickness detection means), 10 -- liner cut equipment, 15 -- motor (traverse means), 22, -- motor (rotation driving means), and 25 -- a cutting edge -- a roll and 27 -- a cutting edge, 31 -- accommodation means, and 37 -- an air cylinder (alienation driving means), 39 -- support roll, and 43 -- motor (attitude driving means).

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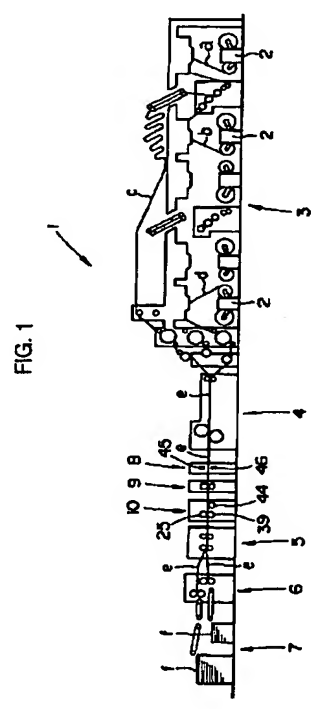
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(54) 【発明の名称】 コルゲートマシン

(57) 【要約】

【課題】 精度の高い破断用ミシン目を容易に形成することができ、しかも段ボール箱の製造効率を向上させることのできるコルゲートマシンを提供する。

【解決手段】 裏ライナ a に段付き中芯 b を貼合して片段ボール c を形成するシングルフェーサ 3 と、片段ボール c に表ライナ d を貼合して段ボール e を形成するダブルフェーサ 4 と、所定の幅寸法に断裁すると共に折目野線を形成するスリッタスコアラ 5 とを備える。ダブルフェーサ 4 とスリッタスコアラ 5 との間に、段ボール e の搬送方向に沿って、段ボール e に破断用ミシン目を形成するライナカット装置 10 を設ける。



【特許請求の範囲】

【請求項1】裏ライナに段付き中芯を貼合して片面ボールを形成するシングルフェーサと、該片面ボールに表ライナを貼合して段ボールを形成するダブルフェーサと、所定の幅寸法に断裁すると共に折目罫線を形成するスリッタスコアラとを備えるコルゲートマシンにおいて、前記ダブルフェーサと前記スリッタスコアラとの間に、前記段ボールの搬送方向に沿って該段ボールの少なくとも一方のライナに破断用ミシン目を形成するライナカット装置を設けたことを特徴とするコルゲートマシン。

【請求項2】前記ライナカット装置は、径方向に鋸刃状に突出する複数の切刃を全周に有し、該切刃を前記段ボールに切り込む方向に進退自在の円盤状の切刃ロールと、

該切刃ロールに対向して前記段ボールを受けるサポートロールと、

前記切刃ロールを前記サポートロールに向かって進退させることにより、切刃ロールとサポートロールとの間隔寸法を調節する調節手段とを備えることを特徴とする請求項1記載のコルゲートマシン。

【請求項3】前記ライナカット装置は、前記切刃ロール及び前記調節手段を、段ボールの搬送方向に直交する方向に所定間隔を存して複数備えると共に、各切刃ロールを、前記段ボールへの切込み位置から選択的に離間させる離間駆動手段を備えることを特徴とする請求項2記載のコルゲートマシン。

【請求項4】前記ライナカット装置は、各切刃ロールを夫々個別の周速で回転駆動する複数の回転駆動手段を備えることを特徴とする請求項3記載のコルゲートマシン。

【請求項5】前記ライナカット装置は、各切刃ロールを、段ボールの搬送方向に直交する方向に横動自在に備えると共に、各切刃ロールを横動させる横動手段を備えることを特徴とする請求項3又は4記載のコルゲートマシン。

【請求項6】前記ダブルフェーサと前記ライナカット装置との間に段ボールの厚み寸法を検出する厚み検出手段を設け、

前記ライナカット装置は、前記サポートロールを前記切刃ロールの方向に進退自在に備えると共に、前記厚み検出手段による検出寸法に応じてサポートロールを進退させる進退駆動手段を備えることを特徴とする請求項2乃至5の何れか1項記載のコルゲートマシン。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、長尺のライナを張り合わせて段ボールを形成すると共に該段ボールを切断して段ボール箱を形成するための矩形状の板紙を製造するコルゲートマシンに関する。

【0002】

【従来の技術】内容物を収納した段ボール箱を開封する際の作業を容易とするために、図7に示すように、段ボール箱hに破断用ミシン目gを延設することが行なわれる。また、破断用ミシン目gの破断開始位置にはH字状の切り込みによるタブiが形成されており、破断用ミシン目gを破断する際に該タブiが手がかりとなる。このような破断用ミシン目gは、段ボール箱hの強度を保持すると共に外観を良好に維持するために、図8に示すように、段ボール箱hの内面側となる段ボールeの裏ライナaにのみ設けられることが好ましい。

【0003】ところで、この種の段ボール箱hは、先ずコルゲートマシンによって矩形状の板紙が製造され、その後、該コルゲートマシンによって形成された板紙に印刷及び打抜き加工が施されることによって製造される。

【0004】前記コルゲートマシンは、裏ライナaに段付き中芯bを貼合して片面段ボールを形成するシングルフェーサ、該片面段ボールに表ライナを貼合して段ボールを形成するダブルフェーサ、折目線を入れつつ所定幅に断裁するスリッタスコアラ、所定の長さ切断して矩形状の板紙を形成するカッタ、板紙の形状に応じて所定の払い出し位置に各板紙を積み上げるスタッカが上流から下流に向かって配設された構成となっている。

【0005】従来、前記破断用ミシン目gは、前記シングルフェーサに設けられたライナカット装置によって形成されることが知られている。これによれば、裏ライナと段付き中芯とが貼合される前に裏ライナにのみ破断用ミシン目gを形成することができる。

【0006】該コルゲートマシンにおいては、図9に説明的に示すように、前記スリッタスコアラ50による断裁時に、破断用ミシン目gと裁断線jとの間隔を正確に所定寸法yに維持する必要がある。しかし、前記シングルフェーサから該スリッタスコアラ50までの距離が比較的長距離であることから、長尺の段ボールに蛇行が生じ、前記所定寸法yを維持して正確な断裁を行なうことが困難である不都合がある。

【0007】また、それ以外に、コルゲートマシンから払い出された段ボール板紙に破断用ミシン目gを形成することが行なわれている。この場合に、前記破断用ミシン目gは、板紙に印刷を施す印刷機に設けられたライナカット装置によって形成されることが知られている。

【0008】しかし、この種の印刷機における段ボール板紙の搬送方向は、コルゲートマシンにおける段ボールの搬送方向と異なる場合がある。即ち、一般に破断用ミシン目gは、図8に示すように、中芯bの凹凸条方向と交差する方向に設けられるが、印刷機における段ボール板紙の搬送方向が、中芯の凹凸条方向に沿った方向とされるため、搬送方向に沿って破断用ミシン目gを形成しても、該破断用ミシン目gは中芯bの凹凸条方向に交差しない。この場合には、印刷機の搬送方向を破断用ミシン目gを形成する方向に一致させるために大掛かりな設

備変更を行わなければならない不都合がある。

【0009】また、この種のライナカット装置は、例えば、図10に示すように、複数の切刃ロール25と、各切刃ロール25に対向する複数のサポートロール51とを備えるものが知られている。各切刃ロール25は、図11に示すように、周方向に沿って径方向に鋸刃状に突出する複数の切刃27を有し、段ボールの幅方向における箱の取り数によって数量が定められる。即ち、図7に示した段ボール箱hを2枚連ねて製造する場合（一般に2丁取りと言われる）には一対の切刃ロール25を1組として4組が単一の回転軸52に軸支される。更に、該回転軸52は、段ボールの通過速度より僅かに速い速度で各切刃ロール25を回転させるように駆動される。なお、該回転軸52の回転速度は、切刃27の裏ライナaへの切り込みを確実にし、且つ不連続な切り込みを維持する速度に設定されている。

【0010】しかし、各組の切刃ロール25は磨耗度合いにばらつきが生じることがあり、これによって、各切刃ロール25の周速が異なるだけでなく、裏ライナへの切り込み深さが異なるおそれがあり、破断用ミシン目gを確実に形成することが困難となる。しかも、各切刃ロール25は単一の回転軸52により回転駆動されるので個々の切刃ロール25の周速及び裏ライナaへの切り込み量を各別に調節することができない不都合がある。更に、段ボールの幅方向における箱の取り数が変更された場合には、切刃ロール25の数を変更された箱の取り数に対応させるために大掛かりな切刃ロール25の交換作業を行わなければならない、段ボール箱の製造効率が低下する原因となる不都合がある。

【0011】

【発明が解決しようとする課題】かかる不都合を解消して、本発明は、精度の高い破断用ミシン目を容易に形成することができ、しかも段ボール箱の製造効率を向上させることができるコルゲートマシンを提供することを目的とする。

【0012】

【課題を解決するための手段】かかる目的を達成するために、本発明は、裏ライナに段付き中芯を貼合して片段ボールを形成するシングルフェーサと、該片段ボールに表ライナを貼合して段ボールを形成するダブルフェーサと、所定の幅寸法に断裁すると共に折目野線を形成するスリッタスコアラとを備えるコルゲートマシンにおいて、前記ダブルフェーサと前記スリッタスコアラとの間に、前記段ボールの搬送方向に沿って該段ボールの少なくとも一方のライナに破断用ミシン目を形成するライナカット装置を設けたことを特徴とする。

【0013】本発明によれば、前記ライナカット装置が前記ダブルフェーサと前記スリッタスコアラとの間に設けられていることによって、前記スリッタスコアラから比較的近い位置において破断用ミシン目を形成すること

ができるので、搬送される段ボールの蛇行の悪影響を小として、破断用ミシン目の形成位置の精度を向上することができる。しかも、従来のような印刷機等によって破断用ミシン目を形成する場合と異なり、段ボールの搬送方向に沿って破断用ミシン目を形成するだけで、段ボールの中芯の凹凸条方向と交差する方向に破断用ミシン目を設けることができる。

【0014】また本発明において、前記ライナカット装置は、径方向に鋸刃状に突出する複数の切刃を全周に有し、該切刃を前記段ボールに切り込む方向に進退自在の円盤状の切刃ロールと、該切刃ロールに対向して前記段ボールを受けるサポートロールと、前記切刃ロールを前記サポートロールに向かって進退させることにより、切刃ロールとサポートロールとの間隔寸法を調節する調節手段とを備えることを特徴とする。

【0015】本発明によれば、例えば、前記切刃ロールの磨耗により、切刃ロールとサポートロールとの間隔寸法が大となったとき、前記調節手段によって切刃ロールとサポートロールとの間隔寸法を適正に調節することができる。これによって、切刃ロールの磨耗による切り込み不良を防止することができ、破断用ミシン目を確実に形成することができる。

【0016】また、本発明において、前記ライナカット装置は、前記切刃ロール及び前記調節手段を、段ボールの搬送方向に直交する方向に所定間隔を存して複数備えると共に、各切刃ロールを、前記段ボールへの切り込み位置から選択的に離間させる離間駆動手段を備えることを特徴とする。

【0017】コルゲートマシンにおいて製造される段ボールは、複数の箱取りを行なうことが可能な幅に形成される。このとき、箱の取り数に応じて切刃ロールが所定間隔を存して複数設けられる。この場合に、各切刃ロール毎に前記調節手段を備えることによって、夫々の切刃ロールに磨耗のばらつきが生じて、各切刃ロール毎にサポートロールとの間隔寸法を適正に調節することができる。また、前記離間駆動手段を備えることによって、例えば箱の取り数が変更されたことにより不要となった切刃ロールのみを段ボールから離間させて退避させることができる。これにより、大掛かりな設備変更をすることなく、箱の取り数の変更に対応させることができ、段ボール箱の製造効率を向上させることができると共に、コストの増加を防止することができる。

【0018】また、本発明において、前記ライナカット装置は、各切刃ロールを夫々個別の周速で回転駆動する複数の回転駆動手段を備えることを特徴とする。これにより、各切刃ロールに磨耗度合いのばらつきが生じて、磨耗に応じた周速を各別に駆動することができるので、精度の高い破断用ミシン目を形成することができる。

【0019】また、本発明において、前記ライナカット

装置は、各切刃ロールを、段ボールの搬送方向に直交する方向に横動自在に備えると共に、各切刃ロールを横動させる横動手段を備えることを特徴とする。これによって、例えば、箱の取り数が増えられたことに伴う破断用ミシン目の形成位置の変更、各切刃ロールの切り込み位置を容易に対応させることができる。これにより、大掛かりな設備変更をすることなく、箱の取り数の変更に対応させることができる。

【0020】また、本発明において、前記ダブルフェーサと前記ライナカット装置との間に段ボールの厚み寸法を検出する厚み検出手段を設け、前記ライナカット装置は、前記サポートロールを前記切刃ロールの方向に進退自在に備えると共に、前記厚み検出手段による検出寸法に応じてサポートロールを進退させる進退駆動手段を備えることを特徴とする。例えば、当該コルゲートマシンにより製造する段ボール規格の変更等によって段ボールの厚みが増えられたとき、前記厚み検出手段によって該段ボールの厚みを検出し、該検出結果に基づいて前記進退駆動手段によってサポートロールを進退させる。このように、段ボールの厚みが増減しても、それに伴ってサポートロールによる段ボールの案内位置を正確に維持することができるので、サポートロールによって案内される段ボールへの切刃ロールの切り込み量の調節を極めて容易に行なうことができる。

【0021】

【発明の実施の形態】本発明の一実施形態を図面に基いて説明する。図1は本実施形態のコルゲートマシンを示す概略構成図、図2はライナカット装置の構成を示す説明図、図3は図2のIII-III線断面説明図、図4は図2のIV-IV線断面説明図、図5は図3のV-V線断面説明図、図6は切刃ロールの回転駆動手段を示す説明図である。

【0022】図1において、1は本実施形態のコルゲートマシンであって、複数のミルロールスタンド2に支持された裏ライナaと中芯bとを貼合して片段ボールcを形成するシングルフェーサ3と、該片段ボールcに表ライナdを貼合して段ボールeを形成するダブルフェーサ4とを備えている。ダブルフェーサ4の下流には段ボールeに折目線を入れつつ所定幅に裁断するスリッタスコアラ5が備えられ、該スリッタスコアラ5の下流には段ボールeを所定長に切断して矩形状の板紙fを形成するカッタ6が備えられている。更に、カッタ6の下流には、板紙fの形状に応じて所定の払い出し位置に各板紙fを積み上げるスタッカ7が備えられている。

【0023】そして、本実施形態のコルゲートマシン1において、ダブルフェーサ4とスリッタスコアラ5との間には、上流側から順に、段ボール厚み検出ユニット（厚み検出手段）8、ロータリーシャ9、及びライナカット装置10が設けられている。

【0024】該ライナカット装置10は、ダブルフェー

サ4から搬送される長尺の段ボールeの裏ライナaに破断用ミシン目（図8の符号g参照）を形成するものである。該ライナカット装置10について詳説すれば、図2に示すように、両側に立設する一対のフレーム11に角型の梁12がわたされている。図2及び図3に示すように、該梁12にはリニアウェイ等のガイド部材13により段ボールeの幅方向に沿って摺動自在の移動台14が取り付けられている。なお、図2においては移動台14が1つのみ示されているが、実際には例えば最大3丁取りを行なうのであれば6個の移動台14が設けられている。

【0025】図2及び図4に示すように、移動台14にはモータ15（横動手段）が設けられており、図4に示すように、該モータ15の軸にはビニオン16が設けられている。該ビニオン16は梁12に設けられたラック17に噛み合い、モータ15が回転することによって移動台14を幅方向に移動させることができる。

【0026】移動台14には支持部材18が固定されており、図5に示すように、支持部材18には中間円筒19が回転自在に支持されている。中間円筒19の中にはスプライン円筒20が図示しないキー等を介して固定して取り付けられている。スプライン円筒20はフレーム11（図2示）間にわたされたスプライン軸21に噛み合っている。そして、図2に示すように、スプライン軸21の一端はモータ22の回転軸が連結されている。該モータ22は、詳しくは図示しないが、段ボールeの搬送速度と異なる速度に適宜設定できるように構成されている。また、図5に示すように、中間円筒19の一端部には、駆動スプロケット23が取り付けられている。

【0027】前記中間円筒19の外周には、アーム24が揺動自在に取り付けられている。該アーム24の他端には、一対の切刃ロール25の支持軸26が回転自在に取り付けられている。該切刃ロール25は、従来の技術欄で説明したものと同様のものであり、図10に示すように鋸刃状に突出する複数の切刃27を外周全周に備えるものである。一対の切刃ロール25はアーム24に支持されてナイフヘッド28を構成する。支持軸26の端部には従動スプロケット29が取り付けられている。該従動スプロケット29は前記駆動スプロケット23にチェーン30を介して接続されており、前記スプライン軸21の回転駆動力がナイフヘッド28に伝達されるようになっている。

【0028】図3に示すように、前記移動台14にはナイフヘッド28の切り込み量を微調節する調節手段31が設けられている。該調節手段31は、移動台14に設けられたリニアウェイ等のガイド部材32に案内されて上下に摺動する取付台33と、移動台14に設けられて回転軸にネジ軸34が連結されたモータ35と、取付台33に設けられてネジ軸34が螺合する螺合部材36とによって構成されている。これにより、モータ35を回

転させることで取付台 33 が上下に移動する。また、取付台 33 には、エアシリンダ 37 が取り付けられており、そのロッド 38 はアーム 24 の先端に連結されている。従って、エアシリンダ 37 のロッド 38 の伸縮に伴ってアーム 24 が揺動する。なお、該エアシリンダ 37 は、本発明の離間駆動手段を構成するものである。

【0029】また、図 2 に示すように、ナイフヘッド 28 の下方には、サポートロール 39 が設けられている。該サポートロール 39 は、フレーム 11 に回転自在に支持された偏心輪 40 に回転自在に支持されている。偏心輪 40 の両端部には歯車 41 が設けられており、中間歯車軸 42 を介してモータ 43（進退駆動手段）により回転駆動されるようになっている。即ち、モータ 43 を回転すると偏心輪 40 が回転し、サポートロール 39 が上下方向に進退移動する。サポートロール 39 は、図示しないがコルゲートマシン 1 全体を駆動する駆動系統、或いは単独の駆動モータ等によって段ボール e の搬送速度と略同速度で回転駆動される。

【0030】また、図 1 に示すように、サポートロール 39 の上流側近傍には段ボール e と略同速度で駆動されるガイドロール 44 が設けられており、サポートロール 39 と共働して段ボール e の搬送姿勢を安定に保つようになっている。

【0031】前記段ボール厚み検出ユニット 8 は、図 1 に示すように、搬送される段ボール e を介して上下に対向する一対のレーザ変位計 45、46 を備えている。該厚み検出ユニット 8 は、上方の変位計 45 が段ボール e の裏ライナ a の表面位置を計測し、同時に下方の変位計 46 が段ボール e の表ライナ d の表面位置を計測することにより基準値との差から段ボール e の厚さを検知するようになっている。

【0032】次に、本実施形態のコルゲートマシン 1 におけるライナカット装置 10 の作動を説明する。図 2 を参照して、先ず、前記モータ 15 を駆動して移動台 14 をガイド部材 13 に沿って横動させ、ナイフヘッド 28 を所定の加工位置に移動する。次いで、エアシリンダ 37 のロッド 38 を伸長させ、ナイフヘッド 28 を下降させる（この位置を稼動位置とする）。このとき、段ボール箱の取り数の関係で不要なナイフヘッド 28 があれば上昇位置（これを待機位置とする）に待機させておく。

【0033】次いで、このとき稼動位置において、切刃ロール 25 の先端とサポートロール 39 との隙間 x が適正でない場合は、調節手段 31 のモータ 35 を駆動しエアシリンダ 37 の位置を微調節する。該調節手段 31 は、各ナイフヘッド 28 について微調節が行なえるので、切刃ロール 25 に磨耗が生じていても、磨耗度合いに応じて前記隙間 x を適正に調節することができる。

【0034】続いて、ナイフヘッド 28 を回転駆動し、

段ボール e（図 1 示）の搬送を開始する。このとき段ボール e の搬送速度と切刃ロール 25 の回転速度との速度差は駆動モータ 22 の回転を制御することにより、好適な速度差に設定できる。

【0035】また、図 1 を参照して、オーダーチェンジ等で段ボール e の厚み寸法が変更された場合は、前記厚み検出ユニット 8 により段ボール e の厚みが検出される。そして、図 2 に示すように、前記モータ 43 の回転によりサポートロール 39 を上下方向に進退移動させ、ナイフヘッド 28 に対する隙間 x を適正に調節することができる。

【0036】なお、本実施形態においては、図 3 に示すように、前記スプライン軸 21 によるモータ 22 の駆動力伝達によってナイフヘッド 28 の切刃ロール 25 を回転させたが、他の例を挙げれば、図 6 に示すように、ナイフヘッド 28 の支持軸 26 にモータ 47 の回転軸を連結してもよい。このとき、モータ 47 は支持部材 48 を介して前記アーム 24 に支持される。これによれば、複数設けられているナイフヘッド 28 を各モータ 47 により各別に回転駆動することができる。そしてこれにより、各ナイフヘッド 28 の切刃ロール 25 をその磨耗度合いに応じた回転速度で回転させることができ、精度の高い破断用ミシン目 g を確実に形成することができる。

【図面の簡単な説明】

【図 1】本発明の一実施形態のコルゲートマシンを示す概略構成図。

【図 2】ライナカット装置の構成を示す説明図。

【図 3】図 2 の III-III 線断面説明図。

【図 4】図 2 の IV-IV 線断面説明図。

【図 5】図 3 の V-V 線断面説明図。

【図 6】切刃ロールの回転駆動手段を示す説明図。

【図 7】展開状態の段ボール箱を示す平面図。

【図 8】段ボールの断面図。

【図 9】スリッタスコアラの作動説明図。

【図 10】従来のライナカット装置の構成を示す説明図。

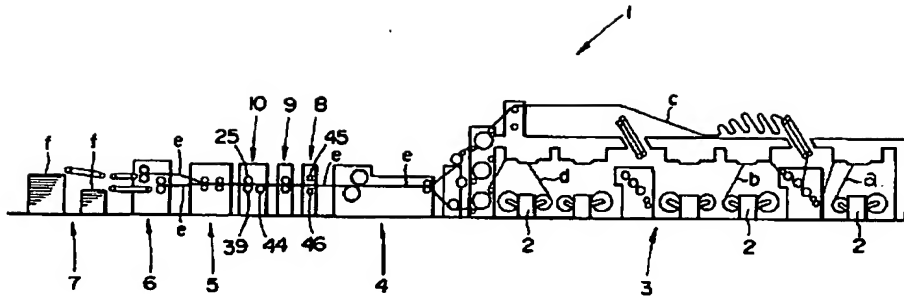
【図 11】切刃ロールの一部を示す説明図。

【符号の説明】

a…裏ライナ、b…中芯、c…片段ボール、d…表ライナ、e…段ボール、g…破断用ミシン目、3…シングルフェーサ、4…ダブルフェーサ、5…スリッタスコアラ、1…コルゲートマシン、8…厚み検出ユニット（厚み検出手段）、10…ライナカット装置、15…モータ（横動手段）、22、…モータ（回転駆動手段）、25…切刃ロール、27…切刃、31…調節手段、37…エアシリンダ（離間駆動手段）、39…サポートロール、43…モータ（進退駆動手段）。

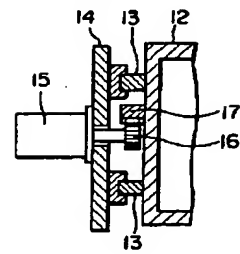
【図1】

FIG. 1



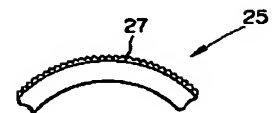
【図4】

FIG. 4



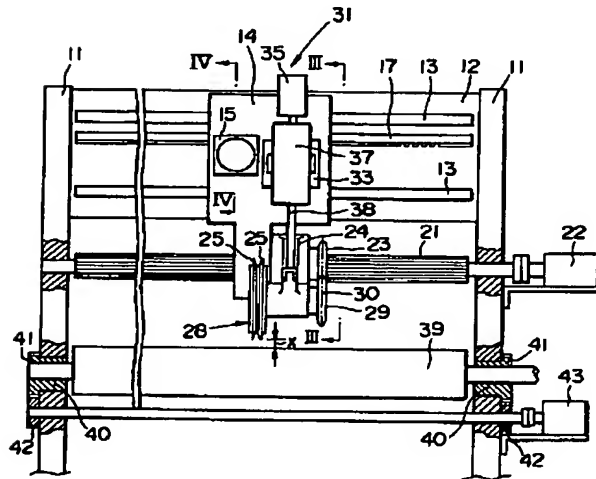
【図11】

FIG. 11



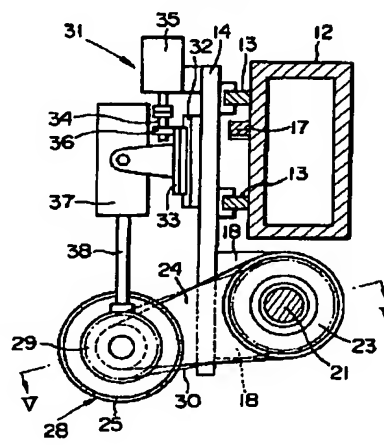
【図2】

FIG. 2



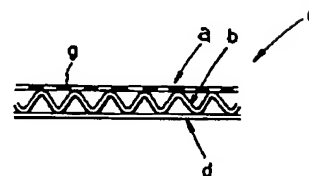
【図3】

FIG. 3



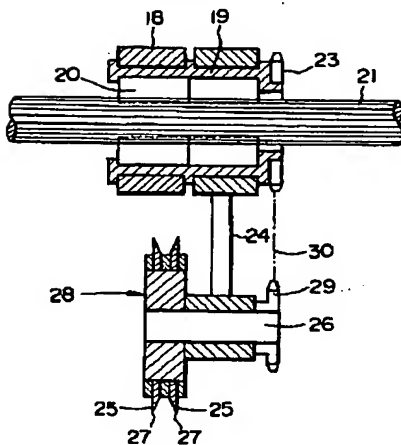
【図8】

FIG. 8



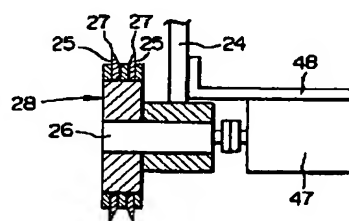
【図5】

FIG. 5



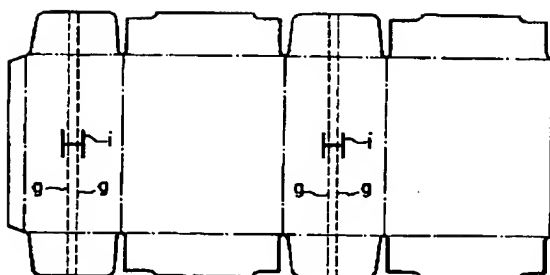
【図6】

FIG. 6



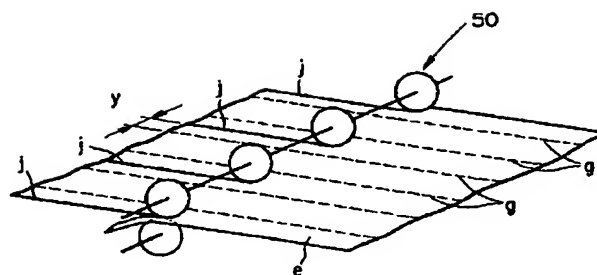
【図7】

FIG. 7



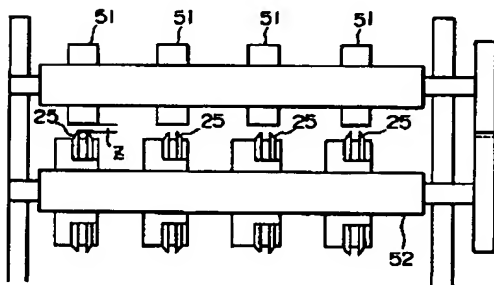
【図9】

FIG. 9



【図10】

FIG. 10



フロントページの続き

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